NAVAL HEALTH RESEARCH CENTER

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ABSTRACT

Objective

The present study was designed to describe the prevalence of dietary supplement use, including androstenedione, ephedrine, and creatine, in a population of active-duty US Marines.

Method

Participants completed a self-report questionnaire that was designed to assess behavioral and health factors in Marines stationed at Camp Pendleton, CA.

Results

Fifty-four percent of the 1482 participants had used dietary supplements in the preceding year. Of the individuals who consumed supplements, 684 (87%) provided detailed information regarding the type of supplement they used. Among supplement users, 443 (65%) consumed multiple supplements and 145 (21%) consumed at least 4 supplements. The most commonly used type of dietary supplement was muscle mass/strength aids (53%) followed by energy boosters (28%) and vitamins/minerals (27%). Of the specific supplements investigated, 350 (51%) of the supplement users consumed a supplement that contained ephedrine, 260 (38%) consumed creatine, and 75 (11%) individuals consumed androstenedione in the previous year.

Conclusions

The level of dietary supplement use in this population requires further investigation due to the reported adverse effects of some of these products. Future studies are needed to determine the prevalence of use as well as the determinants of use in a variety of populations.

INTRODUCTION

The use of dietary supplements is a key component of complementary and alternative medicine. The use of dietary supplements has risen dramatically in recent years, motivated not only by attempts to manage a variety of conditions, but also to improve physical performance and general health. The US federal government allows for the marketing of any substance that affects the structure or function of the body as a dietary supplement without regulation. However, the manufacturers must state on product labels that the product has not been evaluated by the Food and Drug Administration and the product is not intended to diagnose, treat, or prevent disease. Despite the increase in dietary supplement use, little is known about the patterns of use in specific populations. The majority of studies have focused on the frequency of supplement use in older populations[1,2] or have focused strictly on vitamin and mineral supplements.[1,3,4] Young, healthy individuals often consume dietary supplements to improve physical performance and increase muscle mass. This is most common among athletes[5,6] and among individuals with demanding physical occupations.[7]

The present study was designed to describe the prevalence of dietary supplement use, including androstenedione, ephedrine, and creatine, in a population of active-duty US Marine Corps personnel.

METHODS

The Marine Health Behavior Survey was an anonymous self-report questionnaire designed to assess behavioral and health factors in Marines stationed at Camp Pendleton, Calif. Six Marine units were selected to represent major commands at Camp Pendleton including the First Force Service Support Group and the First Marine Division. Surveys were administered in large groups in November 2000 to men and women with various pay grades, job duties, and levels of educational attainment. A total of 1482 questionnaires were collected from 1696 potential individuals available for the study, yielding a participation rate of 87%. Of the 1482 surveys, 13 were excluded because of noncompliance with survey instructions and 19 were excluded because they did not answer questions to determine dietary supplement use, thus resulting in 1450 surveys for the study.

Dietary supplement use was defined as the use of any over-the-counter dietary supplement for the purpose of increasing physical fitness, health, or well being in the year prior to the survey date. For descriptive purposes, supplements were categorized into stimulants (e.g., caffeine pills, ephedrine), muscle mass/strength aids (e.g., protein formulas, creatine), weight loss, energy boosters (carbohydrate gels, food bars), mood/mental ability aids (e.g., kava kava, St. John's Wort), vitamins/minerals, or other substances used for general health (e.g., ginseng, echinacea) by study participants. These categories are based on the purpose of consumption as marketed by the manufacturer and not on the ingredients of the supplement.

RESULTS

Demographics of the participants, by supplement use, are presented in Table 1. Fifty-four percent of the participants had used dietary supplements in the proceeding year. There were no differences in the mean age (23 years), ethnicity, or marital status for supplement users versus non-users; however, there was a significantly higher proportion of women and higher educational status in the supplement users group. Of the individuals who consumed supplements, 684 (87%) provided detailed information regarding the type of supplement they used (Table 2). Among supplement users, 443 (65%) consumed more than one supplement and 145 (21%) consumed at least 4 supplements. The most commonly used type of dietary supplement was muscle mass/strength aids (53%) followed by energy boosters (28%) and vitamins/minerals (27%). Of the specific supplements investigated, 75 (11%) of the supplement users consumed a supplement that contained androstenedione, 260 (38%) consumed creatine, and 350 (51%) individuals consumed ephedrine in the previous year.

DISCUSSION

This study documents a high rate of dietary supplement use in healthy young men and women. Over half of the participants reported use of at least one dietary supplement and nearly a third reported the use of two or more supplements. Weight/strength gain

supplements were the most commonly used, followed by energy boosters and vitamins/minerals. Supplements containing androstenedione, creatine, and ephedrine were also common. There are only a few published studies which have investigated the overall spectrum of dietary supplement use, including ergogenic products used to increase physical fitness.[7,8] Despite the fact that these studies were conducted in specialized populations undergoing intense physical training, such as military special force candidates[7] and new military recruits,[8] this study documents a markedly higher use of androstenedione and creatine.

This level of dietary supplement use in a healthy, young, non-training population is of concern, due to the reported adverse effects of these products. Androstenedione, for example, is hypothesized to increase the risk of gynecomastia,[9] cardiovascular disease,[10] breast cancer in women,[11] and prostate cancer in men.[12] Ephedrine has been associated with tremor, headache,[13] adverse cardiovascular conditions,[14,15] and even death.[13,14,16] Additional studies are needed to determine the prevalence and determinants of dietary supplement use as well as adverse reactions, in order to better educate these populations.

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Table 1. Characteristics of 785 Dietary Supplement Users and 665 Non-users From the Marine Health Behavior Survey

Characteristics	Supplement Use n (%)	No Supplement Use n (%)	*P*-Value
Age, y (n = 1444)			0.496
< 20	114 (14.5)	106 (16.1)	
20-25	538 (68.6)	444 (67.3)	
26-34	96 (12.2)	88 (13.3)	
≥ 35	36 (4.6)	22 (3.3)	
Sex (n = 1446)			0.007
Men	703 (89.9)	623 (93.8)	
Women	79 (10.1)	41 (6.2)	
Ethnicity (n = 1427)			0.607
Non-Hispanic White	444 (57.7)	362 (55.1)	
African-American	84 (10.9)	86 (13.1)	
Hispanic	188 (24.4)	156 (23.7)	
Asian/Pacific Islander/ American Indian/Alaska Native	20 (2.6)	17 (2.6)	
Education (n = 1445)			0.001
High school or less	490 (62.6)	465 (70.2)	
Technical school/some college	240 (30.7)	178 (26.8)	
College degree or beyond	52 (6.7)	20 (3.1)	
Marital status (n = 1449)			0.853
Single	484 (61.7)	412 (62.0)	
Married	248 (31.6)	212 (31.9)	
Other	53 (6.7)	40 (6.1)	

Table 2. The frequency of use of selected dietary supplements for 684 dietary supplement users from the Marine Health Behavior Survey.

Supplement Type	**Frequency (%)**
Stimulants	167 (24.4)
Muscle mass/strength aids	363 (53.1)
Weight loss	177 (25.9)
Energy boosters	190 (27.8)
Mood/mental ability aids	25 (3.7)
Vitamins/minerals	186 (27.2)
General health	62 (9.1)

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14. ABSTRACT (maximum 200 words)

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